

## ASSIGNMENT 9

Textbook Assignment: "Water Treatment" (continued) and "Maintenance of Water Treatment Equipment," chapters 7 and 8, pages 7-26 through 8-31.

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| <p>9-1. What water treatment control test is used to find the coagulation of water to remove color and turbidity?</p> <ol style="list-style-type: none"><li>1. Hardness</li><li>2. Alkalinity</li><li>3. Jar</li><li>4. Taste and odor</li></ol>   | <p>9-5. Data should be recorded on the Potable Water Supply and Distribution Operating Record at what intervals?</p> <ol style="list-style-type: none"><li>1. Hourly</li><li>2. Daily</li><li>3. Weekly</li><li>4. Monthly</li></ol>  |
| <p>9-2. How many times do you repeat the steps of the jar test?</p> <ol style="list-style-type: none"><li>1. Until satisfactory results are obtained</li><li>2. Two times</li><li>3. Three times</li><li>4. Four times</li></ol>   | <p>9-6. Activity files concerning the operating records for Potable Water Supply and Potable Water Treatment should include the current year and how many preceding years?</p> <ol style="list-style-type: none"><li>1. 1</li><li>2. 2</li><li>3. 3</li><li>4. 4</li></ol>                    |
| <p>9-3. There is a total of how many steps required to perform the turbidity test of water with special instruments?</p> <ol style="list-style-type: none"><li>1. Five</li><li>2. Two</li><li>3. Three</li><li>4. Four</li></ol>   | <p>9-7. What type of chlorinator dissolves the gas in a minor flow of water and injects the solution into the flow that is to be treated?</p> <ol style="list-style-type: none"><li>1. Direct feed</li><li>2. Solution feed</li><li>3. Automatic feed</li><li>4. Semiautomatic feed</li></ol> |
| <p>9-4. What step in the instrument procedure for measuring the turbidity in a sample of water determines the turbidity content of the sample?</p> <ol style="list-style-type: none"><li>1. Inserting the glass plunger in the water</li><li>2. Placing the tube in the instrument</li><li>3. Relating the dial reading on the instrument to the instrument chart</li><li>4. Seeing a uniform field through the eyeglass</li></ol> | <p>9-8. What types of diaphragms are used in chlorinators to control chlorine feed?</p> <ol style="list-style-type: none"><li>1. Water and mechanical</li><li>2. Automatic and water</li><li>3. Mechanical and automatic</li><li>4. Semiautomatic and water</li></ol>                         |

9-9. What type of chlorinator is designed for use as emergency equipment or on small installations?

1. Solution feed
2. Volumetric feed
3. Direct feed
4. Gravimetric feed

9-10. Direct feed chlorinators can NOT be used where the pressure of the water being treated exceeds what level?

1. 10 psi
2. 20 psi
3. 30 psi
4. 40 psi

9-11. What type of chlorinator causes fewer chlorine leaks because the chlorine is under a partial vacuum?

1. Direct feed
2. Gravimetric feed
3. Volumetric feed
4. Solution feed

9-12. The type of chlorination equipment used to feed chlorine gas or hypochlorite solution depends on what factor?

1. The water supply pressure
2. The ratio of feed to water treated
3. The method of control
4. The type of chlorine gas being used

9-13. The semiautomatic type of chlorination equipment must be manually adjusted to the

1. dosage
2. type of chlorine
3. start and stop of water flow
4. rate of water flow

9-14. Portable hypochlorination equipment can be used for main disinfection, scale control, and corrosion control.

1. True
2. False

9-15. The maximum capacity of the heavy-duty Midget Chlor-O-Feeder is 95 gallons in what number of hours?

1. 24
2. 18
3. 12
4. 10

9-16. Motor-driven types of hypochlorinators are made fully automatic by the use of what component(s)?

1. A primary electrical control circuit
2. Gears in a Treat-O-Control gearbox.
3. A secondary electrical control circuit
4. A pilot valve in the water supply

9-17. What device in the Model S Hypochlorinator reciprocates the diaphragm?

1. A hydraulically driven eccentric cam
2. A centrifugally actuated flyweight
3. A motor-driven eccentric cam
4. A centripetally actuated flyweight

9-18. When connecting chlorine valves or tubes to cylinders or equipment, you should use one gasket made of what material?

1. Plastic
2. Rubber
3. Lead
4. Fiber

9-19. You can guard against condensation on chlorine cylinder walls by following which of the following preventive maintenance practices?

1. By direct heat to dry the cylinder surfaces
2. By keeping the cylinders wiped dry
3. By treating the cylinders with moisture-resistant compound
4. By ventilating around the equipment

9-20. The daily inspection to detect chlorine leaks in a gaseous chlorinator system should be carried on with the aid of

1. the dissolving action of aqua ammonia in the presence of metals
2. an open bottle of aqua ammonia held near all joints, valves, and piping
3. an open bottle of hydrochloric acid held near all joints, valves, and piping
4. the fuming action of hypochloric acid in the presence of chlorine

9-21. Using tables in appendix III, water strainers and pressure-reducing valves should be checked for proper level at what regular intervals?

1. Daily
2. Weekly
3. Monthly
4. Quarterly

9-22. Chemical dust or spilled chemicals accumulating from the cleaning of dry chemical feeders should be removed with a/an

1. air hose
2. wet sponge
3. cold-water spray
4. vacuum cleaner or brush

9-23. A pot type of solution feeder sediment trap should be cleaned at which of the following times?

1. Quarterly
2. Monthly
3. Weekly
4. Daily

9-24. How often should the exterior shell of the ion-exchange unit be cleaned and painted?

1. Monthly
2. Annually
3. Semiannually
4. Quarterly

9-25. The semiannual servicing of the multiport valve on the ion-exchange water softener includes which of the following steps?

1. Applying grease from a pressure gun to all the fittings
2. Turning the valve through one-half turn and adding more grease
3. Spreading the grease by giving the valve several full turns
4. Each of the above

9-26. The ion-exchange bed must be kept at a certain level during the quarterly flushing to prevent which of the following problems?

1. Loss of resin during backwashing when the elevation is too high
2. Loss of resin during backwashing when the elevation is too low
3. Accumulation of foreign matter when the elevation is too high
4. Accumulation of excess fines when the elevation is too high

9-27. The surface of the supporting gravel under the resin of an ion-exchange bed should be limited to high and low spots differing in elevation by no more than

1. 3.5 inches
2. 2.0 inches
3. 3.0 inches
4. 4.0 inches

9-28. You should replace or add new gravel to the ion-exchange softener unit in how many layers?

1. One
2. Two
3. Three
4. Four

9-29. In a system using an ion-exchange filter, what condition is indicated when the pressure drop across the underdrain is greater than at the time of installation of the filters?

1. Corroded nozzles
2. Displaced nozzles
3. Plugged underdrains
4. Plugged nozzles

9-30. What part of the regeneration unit should be cleaned thoroughly every 6 months?

1. The brine ejector
2. The brine measuring tank
3. The salt storage tank
4. The filter ejector

9-31. Baffled mixing basins require **cleaning** at what regular frequency?

1. Semianually
2. Annually
3. Quarterly
4. Monthly

9-32. To make sure all flocculators are working, you should check the paddle rotation on flocculator basins at what intervals?

1. Weekly
2. Monthly
3. Bimonthly
4. Quarterly

9-33. What part(s) of a flocculator basin should be checked for silt penetration?

1. The underwater bearings
2. The flocculator gears
3. The drive mechanism
4. The flocculator floor

- 9-34. For which of the following reasons should the speed reducer of a revolving sludge collector basin be filled with oil to a level above the seals when the reducer is out of service for a long period of time?
1. To protect the basin from corrosion
  2. To prevent the seals from drying out
  3. To make sure water cannot enter the reducer
  4. All of the above
- 9-35. What action(s) should you take if the sludge buildup in a revolving sludge collector basin causes an overload resulting in a cutout of the overload alarm starter switch?
1. Deactivate the alarm switch
  2. Continue operations
  3. Find the cause of the trouble
  4. Shut down the equipment, drain the tank, and flush out the tank
- 9-36. Cathodic protection fights corrosion in what manner?
1. Current flows from the ac source directly to the metal surface to be protected
  2. Current flows from the ac source through the soil or water to the metal to be protected
  3. The flow of current applies electrical energy that reverses the process of corrosion
  4. The flow of current applies electrical energy that parallels the process of corrosion
- 9-37. Which of the following elements is part of the impressed current system of cathodic protection?
1. Graphite anode
  2. Magnesium anode
  3. Zinc anode
  4. Aluminum anode
- 9-38. Under what circumstances are you allowed to bridge insulated couplings in galvanic anode systems?
1. The damage is obvious
  2. The damage can be easily repaired
  3. Only with engineering advice
  4. Only with consent of a superior
- 9-39. What action should you take if the monthly filter inspection shows signs of mild algae growth?
1. Backwash the filter surface
  2. Remove the filter from service and treat it with hypochlorite solution
  3. Lower the water level to bed surface and then chlorinate
  4. Chlorinate the water before it enters the filter
- 9-40. The quarterly inspection of a gravity filter reveals that the sand grains are so incrustated that affected areas of the filter bed have become clogged. What is one action to remedy this situation?
1. Dig out the incrustation
  2. Treat the filter bed with a strong hypochlorite solution
  3. Backwash the filter completely
  4. Allow inhibited muriatic acid to pass downward through the bed

9-41. Sulfurous acid is to be used as the chemical agent for removing carbonate deposits from the gravity filters in a water treatment plant. A maximum of how many 150-pound cylinders of sulfur dioxide will be needed to produce the required 0.3-percent solution of sulfurous acid if 30,000 gallons of water are to be treated?

1. One
2. Five
3. Three
4. Seven

9-42. After several samples of sand are removed from well-scattered locations during the semiannual inspection of a gravity filter, these samples should be processed in what manner before drying?

1. Each sample should be reduced to 2 pounds of sand, mixed, driven, and quartered
2. Each sample should be quartered and then mixed with another quartered sample
3. The samples should be mixed thoroughly and then reduced by quartering them to about 2 pounds of sand
4. The samples should be mixed thoroughly and then reduced by halving them to about 4 pounds of sand

9-43. What should you be looking for in your semiannual sieve analysis for filter media?

1. A break in the underdrain system
2. Algae, mud balls, or slime
3. Growth of sand size that impairs filtration efficiency
4. Cementation of sand grains with mud balls

9-44. When examining the gravel in a filter bed, you should look for mud balls, improper layering, and clogged filter media.

1. True
2. False

9-45. How often should wash water troughs be inspected for corrosion?

1. Every 2 years
2. Annually
3. Semiannually
4. Quarterly

9-46. Which of the following maintenance operations should NOT be performed weekly on an operating table?

1. Lubrication of transfer valves
2. Cleaning the table inside and out
3. Checking the tension of cable-operated controls
4. Inspection of hydraulic connections

- 9-47. When water does not cause tubercles, what maintenance care is applicable for gravity filter, direct-action rate-of-flow controllers on an average of once every 4 years?
1. Lubricating or tightening the packing
  2. Disassembling the diaphragm pot and rubber diaphragm
  3. Disassembling the controller gate
  4. Inspecting the venturi throat
- 9-48. What maintenance operation is performed once each year in the servicing of the diaphragm pendulum unit loss-of-head gauge?
1. Draining mud from the mud leg
  2. Purging air from the diaphragm
  3. Checking the diaphragm for leakage
  4. Removing dirt from the knife edges
- 9-49. How should in-stock diaphragms be stored?
1. Underwater
  2. In oil
  3. In grease
  4. In a clean air environment
- 9-50. In which of the following respects is the construction of a pressure filter identical to that of a gravity filter?
1. Gravel medium
  2. Filter medium
  3. Underdrain system
  4. Each of the above
- 9-51. Most diatomite filter installations in potable water supply plants are of what type?
1. Pressure
  2. Vacuum
  3. Hydraulic
  4. Pneumatic
- 9-52. You are removing iron oxide from a diatomite filter. You have completed the cleaning procedures; however, the filter is still contaminated. What is your next step?
1. Use a different method of cleaning
  2. Repeat the procedures
  3. Consult your supervisor
  4. Send the filter to DRMO
- 9-53. In diatomite filter elements, the procedure for removing manganese dioxide differs from that of removing iron dioxide in which of the following ways?
1. Anhydrous sodium bisulfite is added to the solution
  2. The manganese dioxide treatment takes longer
  3. The iron dioxide treatment needs no recirculation
  4. The percentage of hypochlorite solution to tank volume is greater
- 9-54. Trays of the waterfall aerator are inspected semiannually for which of the following reasons?
1. Staining
  2. Biological growth
  3. Precipitated iron oxide
  4. Uneven water distribution

9-55. To remove organic growth from the watersides of the removable plates of a porous ceramic diffuser, you should use a 50-percent solution of what type of acid?

1. Hydrochloric
2. Nitric
3. Sulfuric
4. Chromic

9-56. A 30-percent solution of hydrochloric acid should be used to clean porous plate diffusers clogged with

1. dust, soot, or oil
2. manganese oxide
3. grease or debris
4. iron oxide

9-57. Spray nozzle aerators should have nozzles removed at what intervals?

1. Weekly
2. Every 2 weeks
3. Monthly
4. Only as necessary

9-58. The blower should be inspected for internal corrosion or deterioration at what intervals?

1. Annually
2. Semiannually
3. Quarterly
4. Monthly

9-59. The main supply of chlorine for a chlorinator should be stored in a/an

1. separate isolated fireproof room vented only to the outside
2. room next to the chlorinator room
3. unvented fireproof room
4. detached building

9-60. Qualified personnel with suitable respiratory equipment should respond to chlorine escaping in liquid form in what manner?

1. By opening the container valve to let chlorine gas escape
2. By applying water to the leak
3. By moving the leaking chlorine container outside
4. By turning the container so the chlorine escapes in gas form

9-61. One of your men has been overcome by chlorine gas but is conscious. After moving him to the open air and away from the chlorine gas fumes, you should take which of the following steps?

1. Place him flat on his back with his head slightly elevated
2. Put a blanket over him and keep him warm
3. Give him one-half teaspoon of moderate stimulant and call a doctor
4. All of the above

9-62. What factor is NOT a precaution to take when lime is being handled?

1. Wear heavy denim clothing, heavy gloves, and a bandana
2. Flush lime away with water
3. Remove lime dust with a dry pickup vacuum
4. Cover exposed skin with a protective cream



9-63. In a water treatment plant, which of the following safety devices should be maintained on the open tanks?

1. Handholds or ladders on the floor of each tank
2. Handrails 8 to 12 inches above the waterline on each side of the tank
3. Guardrails leading to the tank
4. Enclosed ladders

9-64. What type of breathing apparatus that is effective against poisonous gas can be used in an oxygen deficient atmosphere?

1. Self-contained oxygen breathing apparatus
2. Self-generating oxygen breathing apparatus
3. Hose mask
4. Type N all-purpose gas mask

9-65. During normal operation, in what position should the (a) emergency bypass valve and the (b) regulator control valve of the self-contained OBA be set?

1. (a) Open (b) open
2. (a) Closed (b) closed
3. (a) Closed (b) open
4. (a) Open (b) closed

9-66. In what sequence should the straps of the facepiece (six-strap model) be tightened?

1. Chinstrap, temple straps, top strap
2. Chinstrap, top strap, temple straps
3. Temple straps, chinstrap, top strap
4. Top strap, chinstrap, temple straps

9-67. When donning the side shoulder strap model, you should grasp the harness in what location?

1. Where the waist strap and wrist strap are bound together
2. Where the take-up strap and the shoulder strap are bound together
3. Where the take-up strap and waist strap are bound together
4. Where the wrist strap and take-up strap are bound together

9-68. A ground storage reservoir that depends on its extra height and small diameter to provide enough head pressure for fire fighting is called a/an

1. standpipe
2. elevated storage tank
3. open reservoir
4. underground reservoir

9-69. In what season of the year should ground level concrete storage facilities be inspected for water tightness and structural conditions?

1. Fall
2. Summer
3. Spring
4. Winter

9-70. During the semiannual maintenance of a ground level concrete storage tank, you chip and clean out a wall crack to a depth of one inch and a width of one-quarter inch. What action do you now take to repair the crack?

1. Paint the crack with Portland cement slurry
2. Rough sand the clean crack
3. Fill the crack with rich cement grout
4. Apply iron waterproofing compound to the crack

9-71. One of the baseplates of the tower structure supporting a steel storage tank has collected water. After drilling a 1 1/2-inch hole through the channel-boxed section to allow for drainage, you take what action to complete the repair?

1. Paint the baseplate
2. Apply concrete to the baseplate
3. Grout the baseplate with a mixture of sand and asphalt
4. Grout the baseplate with a mixture of sand and Portland cement

9-72. What condition in the cathodic protection equipment of a steel storage tank will cause damage to the tank?

1. Immersed electrodes
2. Unimmersed electrodes
3. Reversed connections to the rectifier
4. Higher current or voltage than specified on the nameplate of the equipment